

INNOLUX DISPLAY CORPORATION

MT220WW01 V.7 LCD MODULE SPECIFICATION

() Preliminary Specification

(●) Final Specification

Customer

HP

Approved by

Checked by

Prepared by

张镇平

蔡嘉年
OCT/19/2009

孙媛林

王佑艺
10/16/09

09.10.16.

Innolux Display Corporation,

No.160 Kesyue Rd., Chu-Nan Site, Hsinchu Science Park,

Chu-Nan 350, Miao-Li County, Taiwan

Tel: 886-37-586000

Fax: 886-37-586060

Document Number: MT220WW01 V.7-DR4-26

**Version:1.0**

InnoLux copyright
All rights reserved,
Copying forbidden.

Record of Revision

Version	Revise Date	Page	Content																																						
1.0	2009-4-14	All	Pre spec edition																																						
2.0	2009-8-4	5	NTSC Update (From 68% to 70%)																																						
	2009-8-4	5	TCO 5.0 Compliance Update																																						
	2009-8-4	5	Weight Update (From Max 2200g to Max 1800g)																																						
	2009-8-4	7	FFC Cancelled																																						
	2009-8-4	7	Rear View of LCM Update																																						
	2009-8-4	15	<table><tr><th rowspan="2">Parameter[Ⓐ]</th><th rowspan="2">Symbol[Ⓐ]</th><th colspan="3">Value[Ⓐ]</th><th rowspan="2">Unit[Ⓐ]</th><th rowspan="2">Note[Ⓐ]</th></tr><tr><th>Min.[Ⓐ]</th><th>Typ.[Ⓐ]</th><th>Max.[Ⓐ]</th></tr><tr><td>Light Bar Input Voltage[Ⓐ]</td><td>VLED[Ⓐ]</td><td>-[Ⓐ]</td><td>42.9[Ⓐ]</td><td>44.2[Ⓐ]</td><td>VDC[Ⓐ]</td><td>(Duty 100%)[Ⓐ]</td></tr><tr><td>Light Bar Input Current[Ⓐ]</td><td>ILED[Ⓐ]</td><td>-[Ⓐ]</td><td>-[Ⓐ]</td><td>360[Ⓐ]</td><td>mA[Ⓐ]</td><td>1,2,3[Ⓐ]</td></tr><tr><td>Power Consumption[Ⓐ]</td><td>PLED[Ⓐ]</td><td>-[Ⓐ]</td><td>-[Ⓐ]</td><td>15.91[Ⓐ]</td><td>Watt[Ⓐ]</td><td>4[Ⓐ]</td></tr><tr><td>LED Life Time[Ⓐ]</td><td>LBL[Ⓐ]</td><td>-[Ⓐ]</td><td>30000[Ⓐ]</td><td>-[Ⓐ]</td><td>Hrs[Ⓐ]</td><td>5[Ⓐ]</td></tr></table>	Parameter [Ⓐ]	Symbol [Ⓐ]	Value [Ⓐ]			Unit [Ⓐ]	Note [Ⓐ]	Min. [Ⓐ]	Typ. [Ⓐ]	Max. [Ⓐ]	Light Bar Input Voltage [Ⓐ]	VLED [Ⓐ]	- [Ⓐ]	42.9 [Ⓐ]	44.2 [Ⓐ]	VDC [Ⓐ]	(Duty 100%) [Ⓐ]	Light Bar Input Current [Ⓐ]	ILED [Ⓐ]	- [Ⓐ]	- [Ⓐ]	360 [Ⓐ]	mA [Ⓐ]	1,2,3 [Ⓐ]	Power Consumption [Ⓐ]	PLED [Ⓐ]	- [Ⓐ]	- [Ⓐ]	15.91 [Ⓐ]	Watt [Ⓐ]	4 [Ⓐ]	LED Life Time [Ⓐ]	LBL [Ⓐ]	- [Ⓐ]	30000 [Ⓐ]	- [Ⓐ]	Hrs [Ⓐ]	5 [Ⓐ]
Parameter [Ⓐ]	Symbol [Ⓐ]	Value [Ⓐ]				Unit [Ⓐ]	Note [Ⓐ]																																		
		Min. [Ⓐ]	Typ. [Ⓐ]	Max. [Ⓐ]																																					
Light Bar Input Voltage [Ⓐ]	VLED [Ⓐ]	- [Ⓐ]	42.9 [Ⓐ]	44.2 [Ⓐ]	VDC [Ⓐ]	(Duty 100%) [Ⓐ]																																			
Light Bar Input Current [Ⓐ]	ILED [Ⓐ]	- [Ⓐ]	- [Ⓐ]	360 [Ⓐ]	mA [Ⓐ]	1,2,3 [Ⓐ]																																			
Power Consumption [Ⓐ]	PLED [Ⓐ]	- [Ⓐ]	- [Ⓐ]	15.91 [Ⓐ]	Watt [Ⓐ]	4 [Ⓐ]																																			
LED Life Time [Ⓐ]	LBL [Ⓐ]	- [Ⓐ]	30000 [Ⓐ]	- [Ⓐ]	Hrs [Ⓐ]	5 [Ⓐ]																																			
	2009-8-4	P16	White Uniformity Minimum Data Update																																						
3.0	2009-9-29	P15	Minimum LED Lifetime Update																																						



SPEC NO. MT220WW01 V.7

PAGE

4/24

Contents:**A. General Specification****B. Electrical Specifications**

1. Pin assignment

2. Absolute maximum ratings

3. Electrical characteristics

a. Typical operating conditions

b. Display color vs. input data signals

c. Input signal timing

d. Display position

e. Backlight Unit

C. Optical specifications**D. Reliability test items****E. Safety****F. Display quality****G. Handling precaution****H. Label****I. Mechanical drawings****Appendix**



SPEC NO. MT220WW01 V.7

PAGE

5/24

A. General Specification

NO.	Item	Specification	Remark
1	Display resolution (pixel)	1680(H) X 1050(V), WSXGA+ resolution	
2	Active area (mm)	473.76(H) X 296.1(V)	
3	Screen size (inch)	22 inches diagonal	
4	Pixel pitch (mm)	0.282(H) X 0.282(V)	
5	Color configuration	R, G, B vertical stripe	
6	Overall dimension (mm)	493.7 (W) X 320.1 (H) X 9.8 (D) (Typ.)	
7	Weight (g)	1800 (Max.)	
8	Power Consumption(W)	20.5W (Typ.)	
9	Surface treatment	Anti-glare, Haze = 25%, Hard coating (3H)	Note 1
10	Input color signal	8 bit LVDS	
11	Display colors	16.7 M (6 bit with Hi-FRC)	
12	Color saturation	70% NTSC	
13	Optimum viewing direction	6 o'clock	
14	Backlight	Side-light bar (White LED)	
15	RoHS	RoHS compliance	
16	Halogen Free	Halogen free compliance	
17	TCO 5.0	TCO 5.0 compliance	Note 2

Note 1: Glare Option available

Note 2: Only Anti-Glare can meet TCO 5.0.



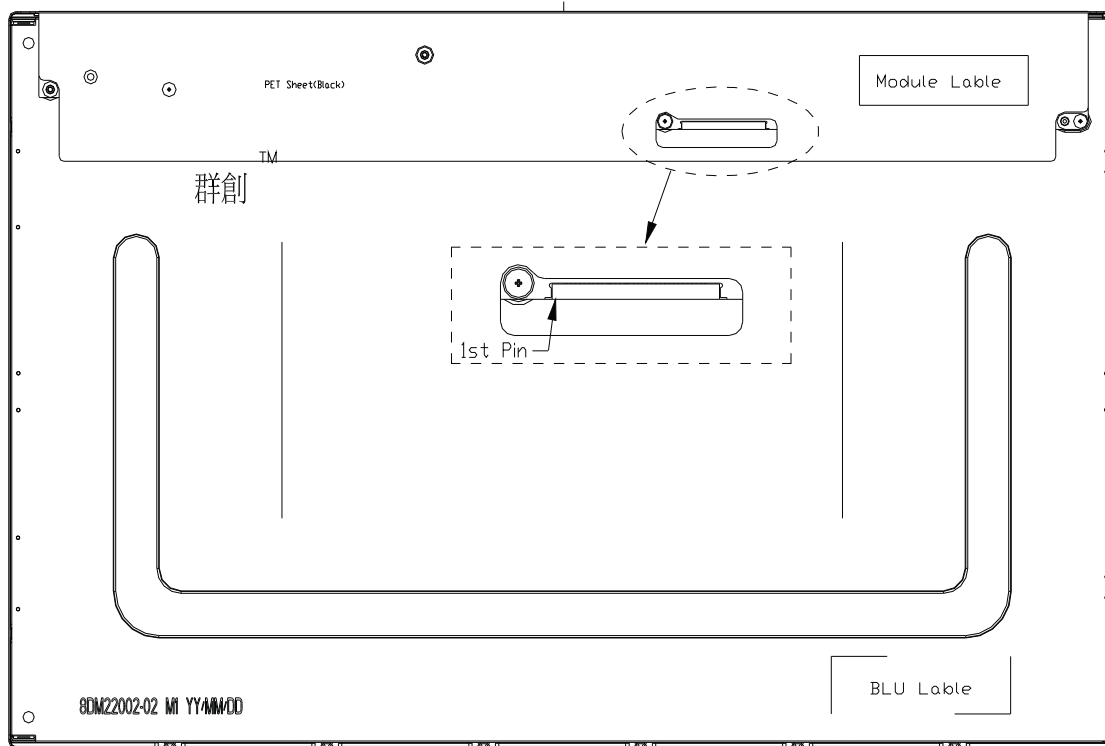
B. Electrical Specifications

1.Pin assignment

1.1. TFT panel Connector

Foxconn GS23302-0011R-7F or mechanical interface equivalent connector.

Pin No.	Symbol	Description
Frame	VSS	Ground
1	RXinO0-	-LVDS differential data input, Chan 0-Odd
2	RXinO0+	+LVDS differential data input, Chan 0-Odd
3	RXinO1-	-LVDS differential data input, Chan 1-Odd
4	RXinO1+	+LVDS differential data input, Chan 1-Odd
5	RXinO2-	-LVDS differential data input, Chan 2-Odd
6	RXinO2+	+LVDS differential data input, Chan 2-Odd
7	VSS	Ground
8	RXOC-	-LVDS differential Clock input (Odd)
9	RXOC+	+LVDS differential Clock input (Odd)
10	RXinO3-	-LVDS differential data input, Chan 3-Odd
11	RXinO3+	+LVDS differential data input, Chan 3-Odd
12	RXinE0-	-LVDS differential data input, Chan 0-Even
13	RXinE0+	+LVDS differential data input, Chan 0-Even
14	VSS	Ground
15	RXinE1-	-LVDS differential data input, Chan 1-Even
16	RXinE1+	+LVDS differential data input, Chan 1-Even
17	VSS	Ground
18	RXinE2-	-LVDS differential data input, Chan 2-Even
19	RXinE2+	+LVDS differential data input, Chan 2-Even
20	RXEC-	-LVDS differential Clock input (Even)
21	RXEC+	+LVDS differential Clock input (Even)
22	RXinE3-	-LVDS differential data input, Chan 3-Even
23	RXinE3+	+LVDS differential data input, Chan 3-Even
24	VSS	Ground
25	VSS	Ground
26	NC	No Connection
27	VSS	Ground
28	VCC	+5.0V power supply
29	VCC	+5.0V power supply
30	VCC	+5.0V power supply
Frame	VSS	Ground

**Rear View of LCM**

1.2. Recommend Connector for Backlight Unit

This connector is mounted on the monitor system board for LED light-bar FFC mating.

Connector Name/Designation	Match Connector
Manufacturer	Entery INDUSTRIAL CO.,LTD
Mating type part number	7080-Q10N-00R

1.3 Light-bar Connector Pin Assignment

Upper Light-bar Connector Pin Assignment:

Pin No	Symbol	Description
1	IRLED1	LED current sense for string 1
2	IRLED1	LED current sense for string 1
3	IRLED2	LED current sense for string 2
4	VLED	LED power supply
5	VLED	LED power supply
6	VLED	LED power supply
7	VLED	LED power supply
8	IRLED2	LED current sense for string 2
9	IRLED3	LED current sense for string 3
10	IRLED3	LED current sense for string 3

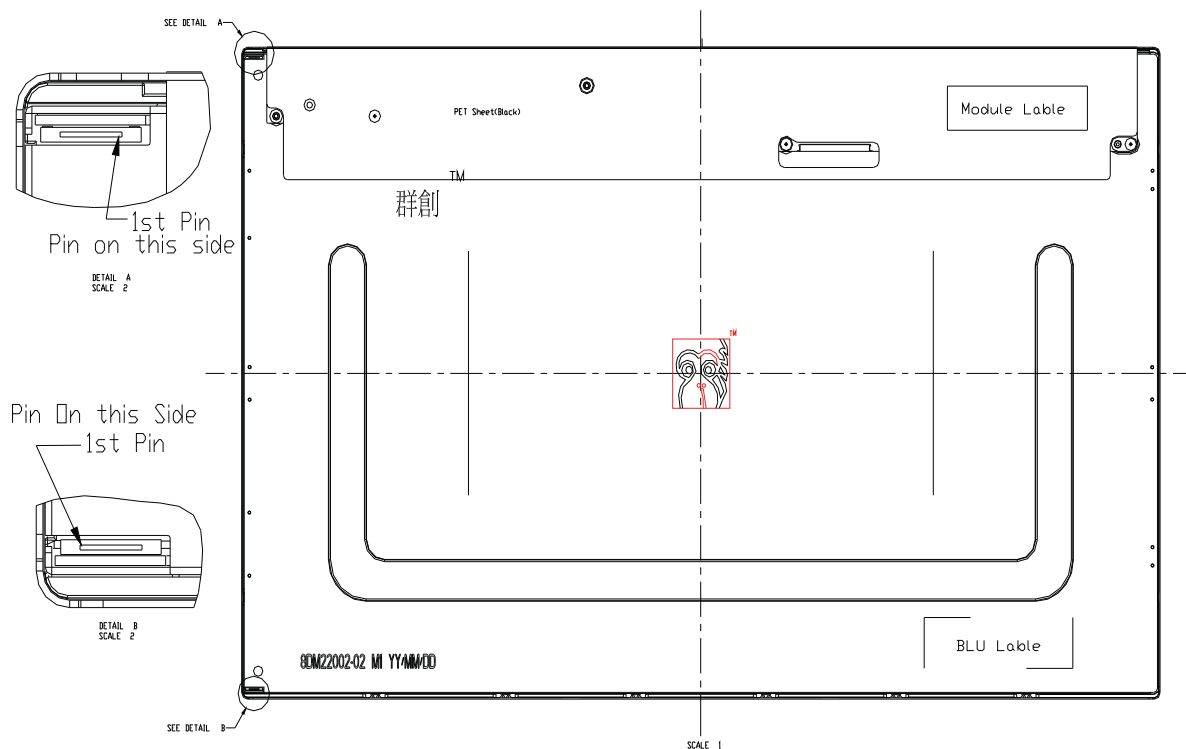
SPEC NO. MT220WW01 V.7

PAGE

8/24

Lower Light-bar Connector Pin Assignment:

Pin No	Symbol	Description
1	IRLED1	LED current sense for string 1
2	IRLED1	LED current sense for string 1
3	IRLED2	LED current sense for string 2
4	VLED	LED power supply
5	VLED	LED power supply
6	VLED	LED power supply
7	VLED	LED power supply
8	IRLED2	LED current sense for string 2
9	IRLED3	LED current sense for string 3
10	IRLED3	LED current sense for string 3



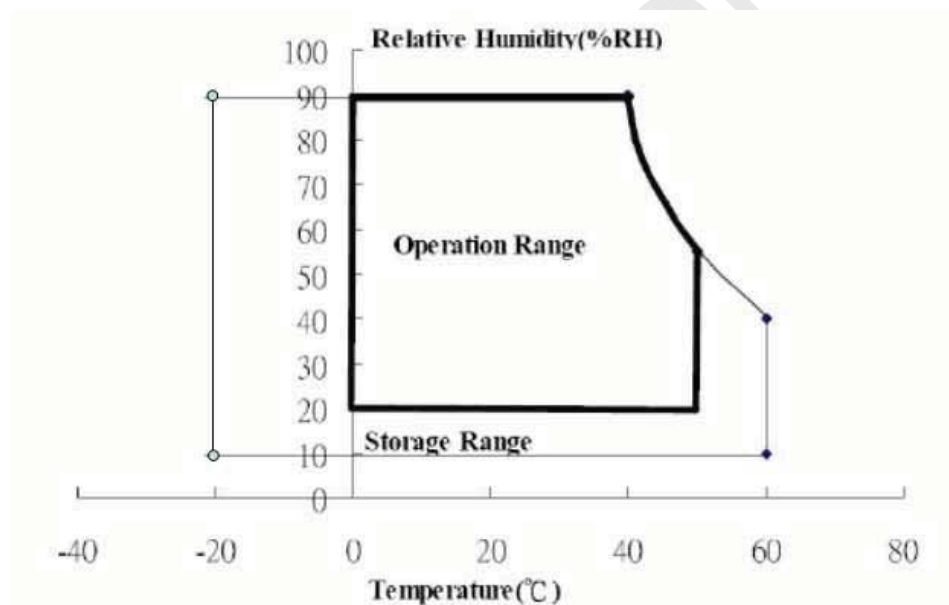
Rear View of LCM

2. Absolute maximum ratings

Parameter	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V_{CC}	-0.3	6.0	V	At 25°C
Input signal voltage	V_{LH}	-0.3	4.3	V	At 25°C
Operating temperature	T_{op}	0	50	°C	Note 1
Storage temperature	T_{ST}	-20	60	°C	Note 2

Note 1: The relative humidity must not exceed 90% non-condensing at temperatures of 40°C or less. At temperatures greater than 40°C, the wet bulb temperature must not exceed 39°C.

Note 2: The unit should not be exposed to corrosive chemicals.



3. Electrical characteristics

a. Typical operating conditions

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Input Voltage		V_{cc}	4.5	5	5.5	V	
Permissive Power Input Ripple		V_{RF}	-	-	0.25	V	
Input Current	Black	I_{cc}	-	900	1400	mA	Note 1
	White	I_{cc}	-	700	-		Note 2
	Mosaic	I_{cc}	-	800	-		Note 3
Rush Current		I_{Rush}	-	-	4	A	Note 4
Logic Input	Common Mode Voltage	VCM	-	1.2	-	V	
Voltage LVDS: IN+, IN-	Differential Input Voltage	VID	100	-	600	mV	
	Threshold Voltage (High)	VTH	-	-	100	mV	Note 5
	Threshold Voltage (Low)	VTL	-100	-	-	mV	Note 5

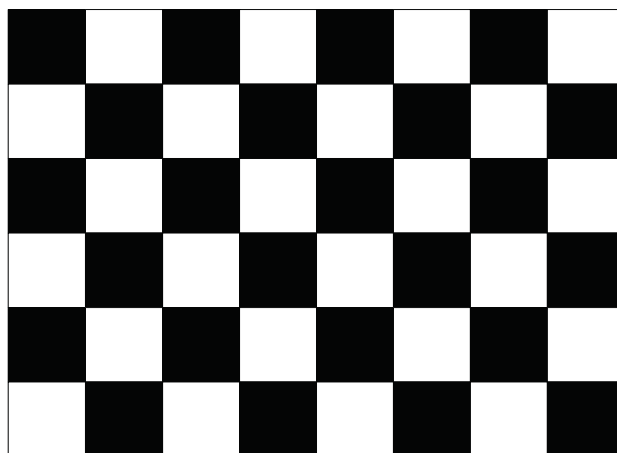
Note 1 : The specified current is under the $V_{cc} = 5V$, $25^{\circ}C$, $f_v = 60Hz$ (frame frequency) condition whereas black pattern is displayed.

Note 2 : The specified current is under the $V_{cc} = 5V$, $25^{\circ}C$, $f_v = 60Hz$ (frame frequency) condition whereas white pattern is displayed.

Note 3 : The specified current is under the $V_{cc} = 5V$, $25^{\circ}C$, $f_v = 60Hz$ (frame frequency) condition whereas mosaic pattern(black & white [8*6]) is displayed.

White : 255 Gray

Black : 0 Gray



SPEC NO. MT220WW01 V.7

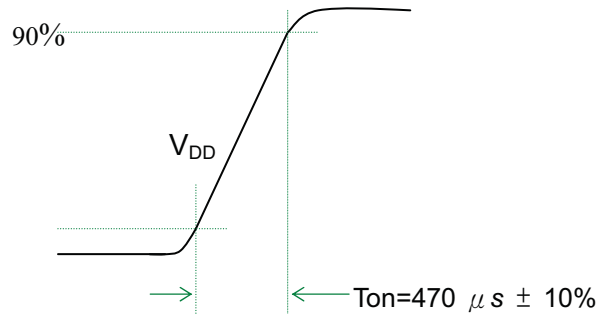
PAGE

11/24

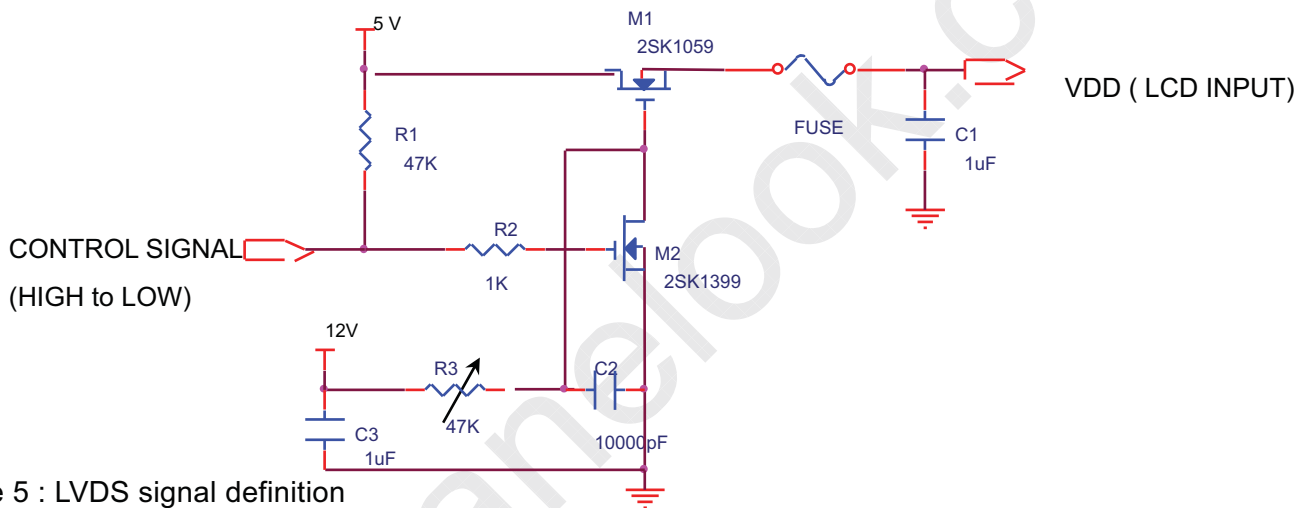
Note 4 : test condition :

(1) $V_{DD} = 5\text{ V}$, V_{DD} rising time = $470\text{ }\mu\text{s} \pm 10\%$

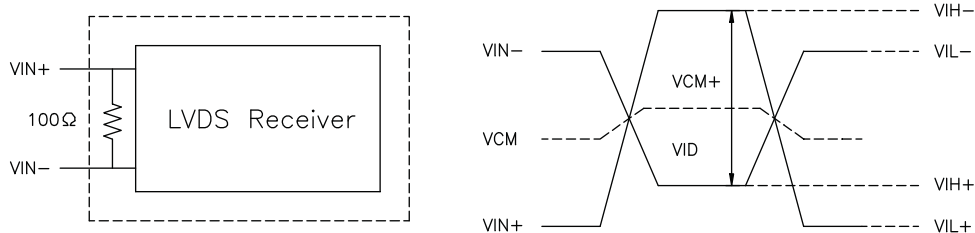
(2) Pattern: Mosaic pattern



(3) Test circuit



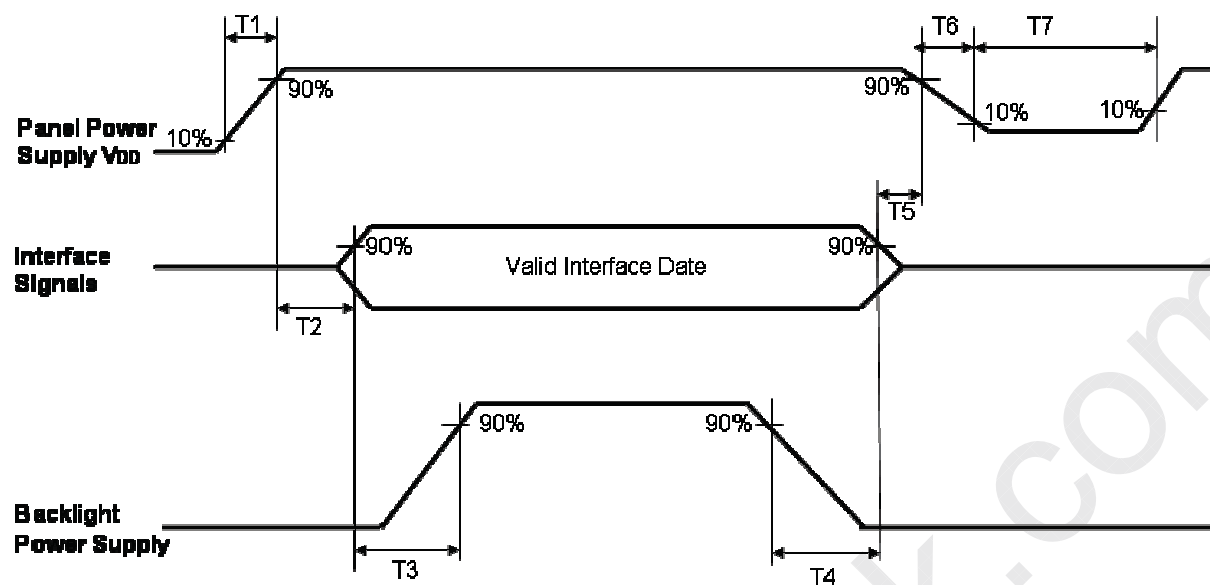
Note 5 : LVDS signal definition

 VIN_+ = Positive differential DATA & CLK Input VIN_- = Negative differential DATA & CLK Input $VID = VIN_+ - VIN_-$, $\Delta VCM = |VCM_+ - VCM_-|$, $\Delta VID = |VID_+ - VID_-|$, $VID_+ = |VIH_+ - VIH_-|$, $VID_- = |VIL_+ - VIL_-|$, $VCM = (VIN_+ + VIN_-)/2$, $VCM_+ = (VIH_+ + VIH_-)/2$, $VCM_- = (VIL_+ + VIL_-)/2$,

SPEC NO. MT220WW01 V.7

PAGE

12/24

Note 6 : Power on sequence for LCD V_{DD} 

Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	0.1	--	10	ms
T2	0	--	50	ms
T3	200	250	--	ms
T4	100	250	--	ms
T5	0	20	50	ms
T6	0.1	--	10	ms
T7	1000	--	--	ms

**b. Display color vs. input data signals**

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

Color		Input color data																							
		Red								Green								Blue							
		MSB				LSB				MSB				LSB				MSB				LSB			
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red	Red(000) dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(001)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(002)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255) bright	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green	Green(000)dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(002)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255)bright	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Blue	Blue(000) dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(002)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue(255) bright	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

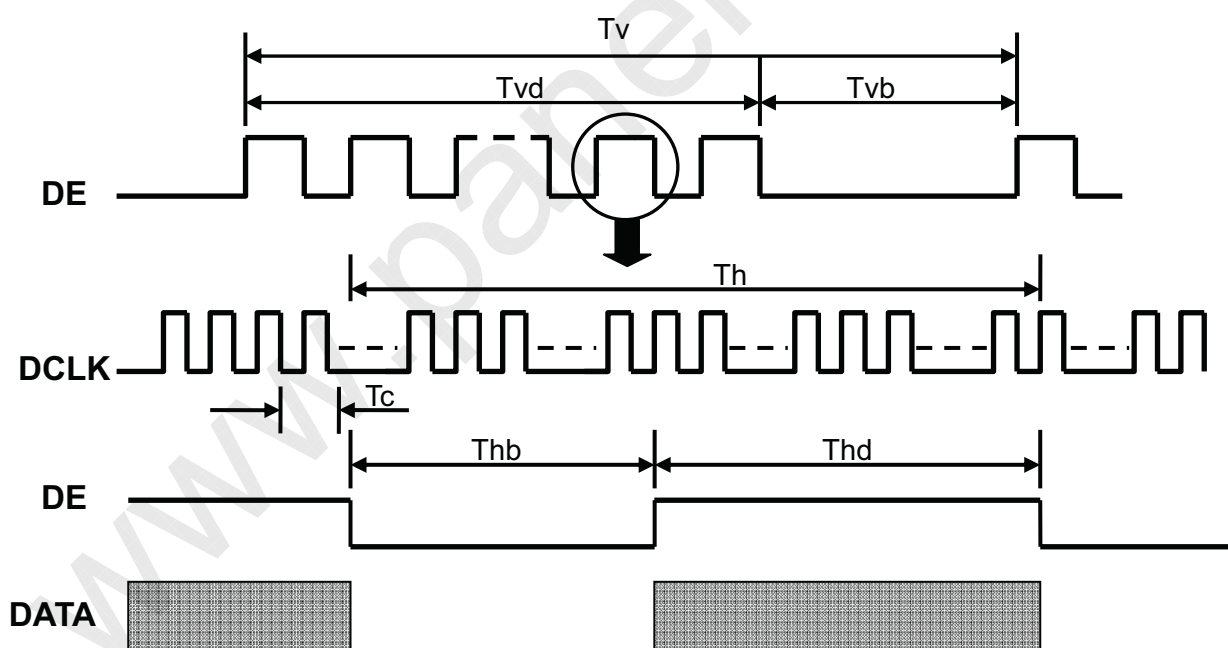
c. Input signal timing

Support Input Timing Table

The input signal timing specifications are shown as the following table and timing diagram.

Signal	Item	Description	Min.	Typ.	Max.	Unit
Clock	Dclk	period	12.2	16.8	21.23	nS
		frequency	47.1	59.6	82	MHz
Vertical	T_{V_TOTAL}	V total line number	1059	1080	1100	T_H
	T_{V_DATA}	Data duration	1050	1050	1050	T_H
	T_{VB}	V-blank	9	30	50	T_H
	f_V	frequency	50	60	76	Hz
Horizontal	T_{H_TOTAL}	H total pixel number	890	920	1004	DClk
	T_{H_DATA}	Data duration	840	840	840	DClk
	T_{HB}	H-blank	73	80	164	DClk

Note: Because this module is operated by DE only mode, Hsync and Vsync input signals should be set to low logic level or ground. Otherwise, this module would operate abnormally.

INPUT SIGNAL TIMING DIAGRAM



SPEC NO. MT220WW01 V.7

PAGE

15/24

d. Display Position

D(1, 1)	D(2, 1)	.....	D(840, 1)	.....	D(1679, 1)	D(1680, 1)
D(1, 2)	D(2, 2)	.....	D(840, 2)	.....	D(1679, 2)	D(1680, 2)
⋮		⋮	⋮	⋮
D(1, 525)	D(2, 525)	.....	D(840, 525)	.....	D(1679, 525)	D(1680, 525)
⋮		⋮	⋮	⋮
D(1, 1049)	D(2, 1049)	.....	D(840, 1049)	.....	D(1679, 1049)	D(1680, 1049)
D(1, 1050)	D(2, 1050)	.....	D(840, 1050)	.....	D(1679, 1050)	D(1680, 1050)

e. Backlight Unit

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Light Bar Input Voltage	VLED	-	42.9	44.2	VDC	(Duty 100%)
Light Bar Input Current	ILED	-	-	360	mADC	1,2,3
Power Consumption	PLED	-	-	15.91	Watt	4
LED Life Time	LBL	30,000	-	-	Hrs	5

Note 1: There are two Light Bars, and the specified current is input LED chip 100% duty current.

Note 2: The sensing current of each string is 60mA.

Note 3: Each light bar have three current sensing strings, so that each light bar input current is 180mA.

Note 4: $P_{LED} = I_{LED} \times V_{LED}$.

Note 5: The life time is determined as the time at which luminance of the LED becomes 50% of the initial brightness or not normal lighting at $I_{LED}=360mA$ on condition of continuous operating at $25\pm2^{\circ}C$.

**C. Optical Specifications**

Item	Symbol	Condition	Specification			Unit	Remark
			Min.	Typ.	Max.		
Response time	Tr	$\theta = 0^\circ$		1.5	3	ms	Note 2
	Tf			3.5	7		
	Tr+Tf			5	10		
Contrast ratio	CR	$\theta = 0^\circ$	700	1000			Note 1,3
Viewing angle	Top	$CR \geq 10$	70	80		deg.	Note 1,3,5
	Bottom	$CR \geq 10$	70	80			
	Left	$CR \geq 10$	75	85			
	Right	$CR \geq 10$	75	85			
Brightness (Center)	YL		200	250		nit	Note 1,4,8
Color chromaticity(CIE)	Wx	$\theta = 0^\circ$	-0.03	0.313	+0.03		Note 1
	Wy			0.329			
	Rx			0.640			
	Ry			0.345			
	Gx			0.324			
	Gy			0.619			
	Bx			0.150			
	By			0.059			
White uniformity (9 points)	δw		0.70	0.75			Note 1,6
Cross talk	Ct				1.5%		Note 7

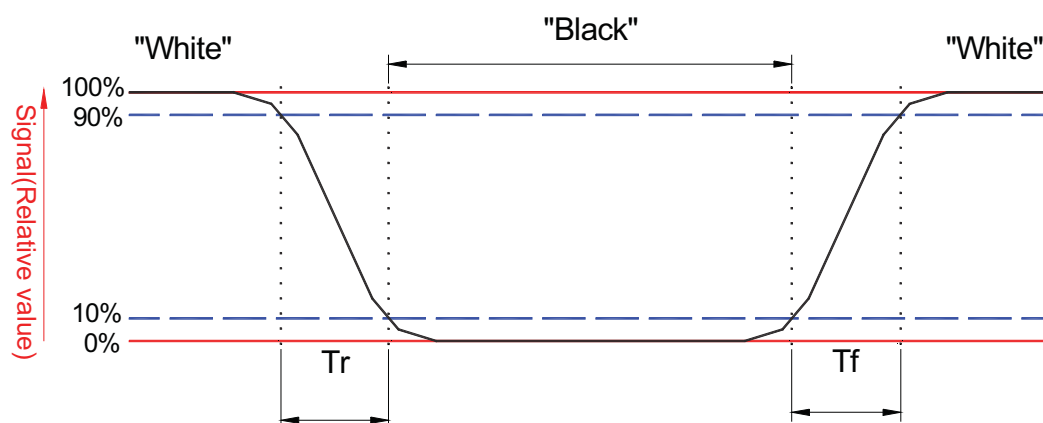
Note : Ambient temperature = 25°C.

To be measured in dark room after backlight warm up 10 minutes.

Note 1: To be measured with a viewing cone of 2° by Topcon luminance meter BM-5A.

Note 2: Definition of response time:

The output signals of BM-7 are measured when the input signals are changed from "Black" to "White" (falling time) and from "White" to "Black" (rising time), respectively. The response time interval is between the 10% and 90% of amplitudes. Refer to figure as below :



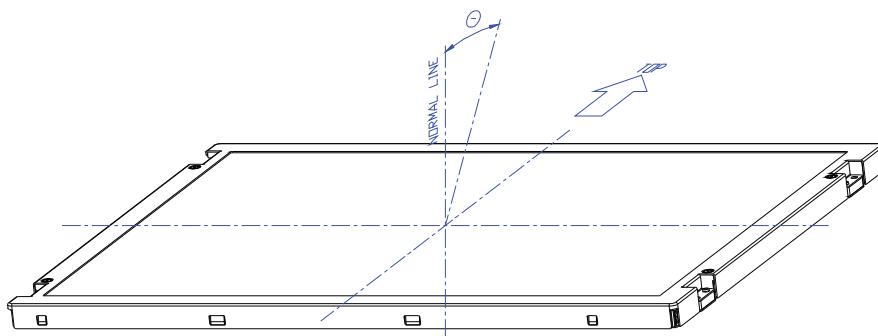
Note 3: Definition of contrast ratio:

Contrast ratio is calculated by the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

Note 4: Driving conditions for LED Light Bar: $I_{LED}=360\text{mA}$

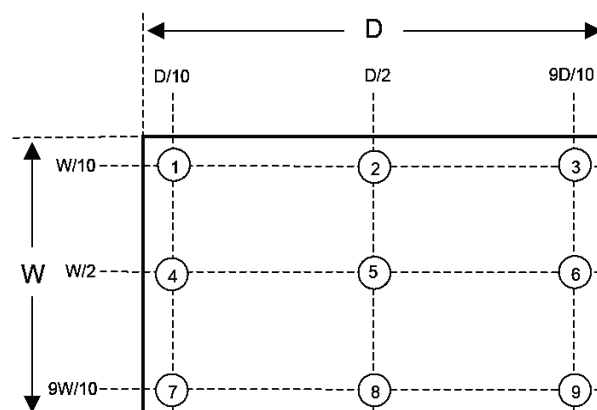
Note 5: Definition of viewing angle.



Note 6: Definition white uniformity:

Luminance are measured at the following nine points (P1~P9).

$$\delta_w = \frac{\text{Minimum Brightness of nine points (P1~P9)}}{\text{Maximum Brightness of nine points (P1~P9)}}$$

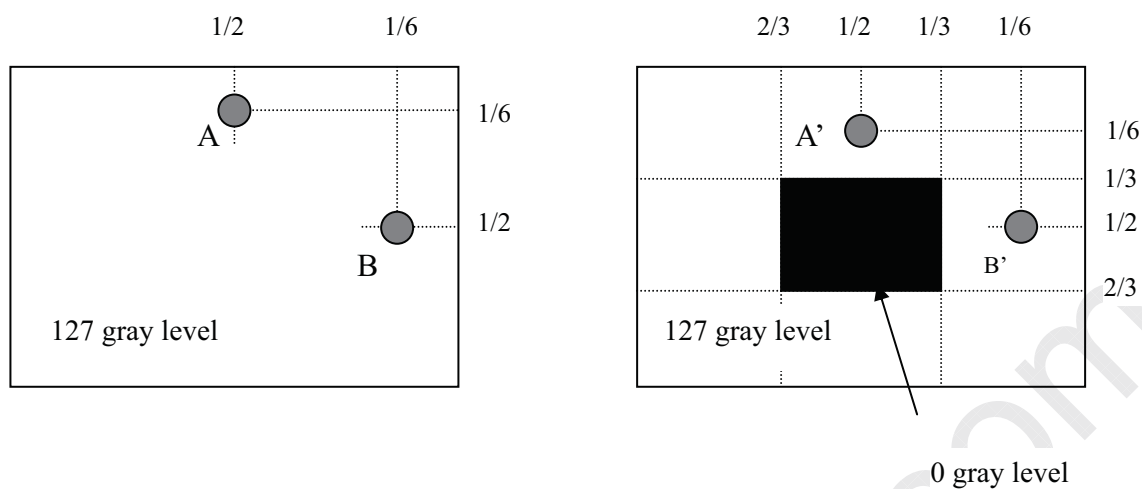


SPEC NO. MT220WW01 V.7

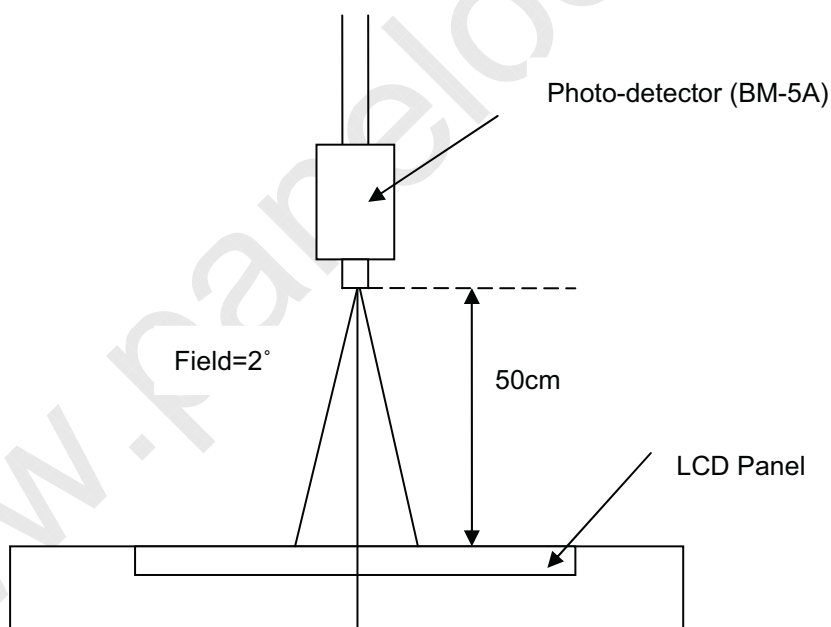
PAGE

18/24

Note 7:

 $|L_A - L_{A'}| / L_A \times 100\% = 1.5\% \text{ max.}$, L_A and $L_{A'}$ are brightness at location A and A' $|L_B - L_{B'}| / L_B \times 100\% = 1.5\% \text{ max.}$, L_B and $L_{B'}$ are brightness at location B and B'

Note 8: Optical characteristic measurement setup.



**D. Reliability test items**

Test Item	Test Condition	Judgment	Remark
High temperature storage	60°C, 240Hrs	Note 1	Note 2
Low temperature storage	-20°C, 240Hrs	Note 1	Note 2
High temperature & high humidity operation	40°C, 90%RH, 240Hrs (No condensation)	Note 1	Note 2
High temperature operation	50°C, 240Hrs	Note 1	Note 2
Low temperature operation	0°C, 240Hrs	Note 1	Note 2
Thermal Shock (non-operation)	-20°C~60°C -20°C /1Hr, 60°C /1Hr, 100cycles	Note 1	Note 2
Electrostatic discharge (ESD) (non-operation)	Contact: +/-8kV, 150pF(330ohms), 10 times/1 point, 1 time/1 sec, total 16 points Air discharge: +/-15kV, 150pF(330ohms), 10 times/1 point, 1 time/1 sec, total 9 points time/1 sec, total 9 points	Note 1	Note 2
Vibration (non-operation)	Vibration level : 1.5G Bandwidth : 10-300Hz Waveform : sine wave, sweep rate : 10min 30 min for each direction X, Y, Z (1.5 Hrs in total)	Note 1	Note 2
Mechanical Shock (non-operation)	Shock level : 50G, 11ms Waveform : Half sine wave Direction : ±X, ±Y, ±Z One time each direction	Note 1	Note 2
MTBF Demonstration	30,000 hours with confidence level 90%	Note 1	Note 3

Note1: Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.

Fail: No display image, obvious non-uniformity, or line defects.

Note2: Evaluation should be tested after storage at room temperature for two hour.

Note 3: The MTBF calculation is based on the assumption that the failure rate distribution meets the Exponential Model.



E. Safety

1. Sharp Edge Requirements

There will be no sharp edges or corners on the display assembly that could cause injury.

2. Materials

a. Toxicity

There will be no carcinogenic materials used anywhere in the display module. If toxic materials are used, they will be reviewed and approved by the responsible InnoLux Toxicologist.

b. Flammability

All components including electrical components that do not meet the flammability grade UL94-V1 in the module will complete the flammability rating exception approval process. The printed circuit board will be made from material rated 94-V1 or better. The actual UL flammability rating will be printed on the printed circuit board.

c. Capacitors

If any polarized capacitors are used in the display assembly, provisions will be made to keep them from being inserted backwards.

F. Display quality

The display quality of the color TFT-LCD module should be in compliance with the Innolux's Incoming inspection standard.

G. Handling precaution

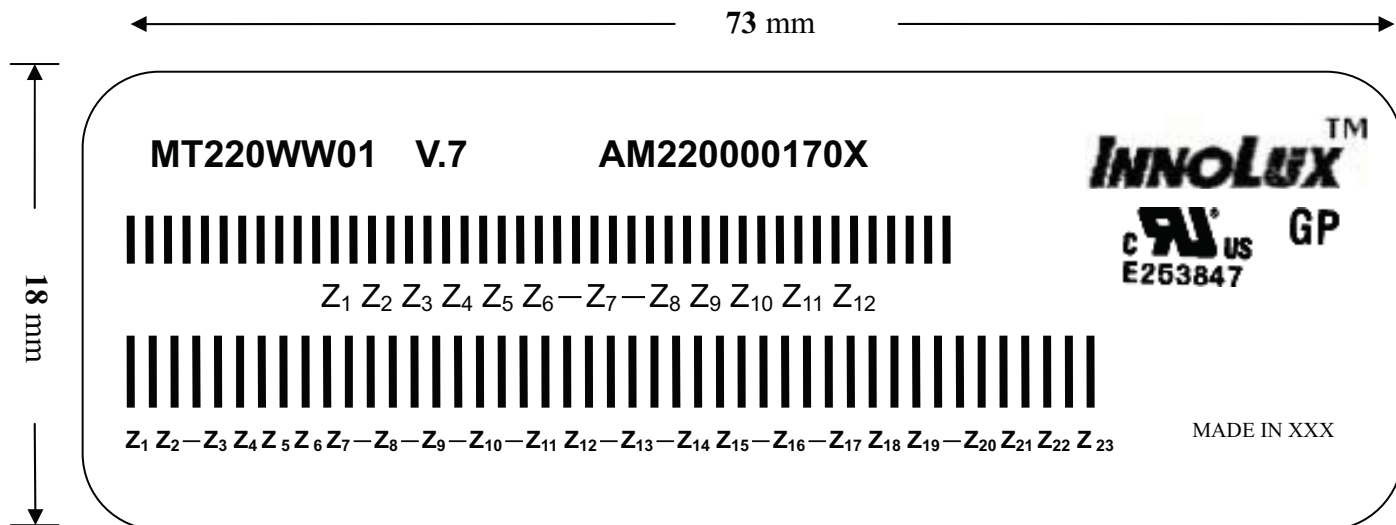
The Handling of the TFT-LCD should be in compliance with the Innolux's handling principle standard.

SPEC NO. MT220WW01 V.7

PAGE : 21/24

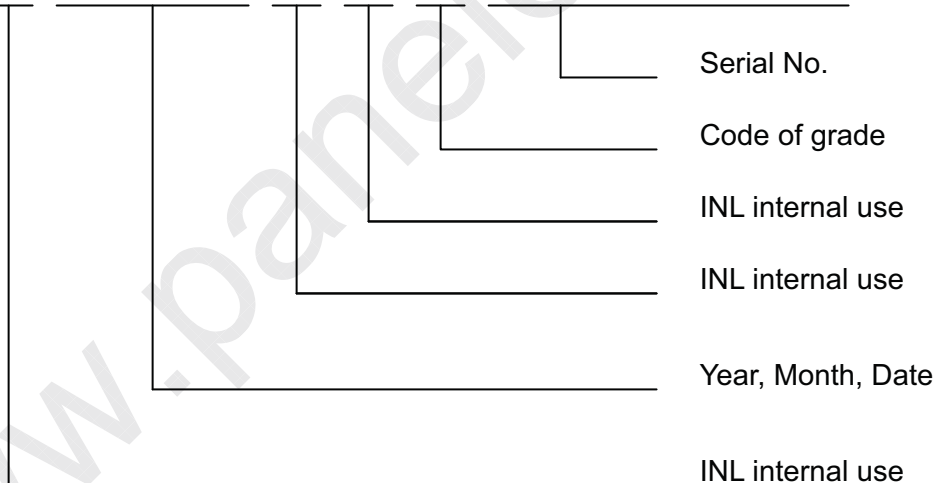
H. Label

1. Module Label



(a) Model Number: MT220WW01

(b) Version: V.7

(c) Serial ID I: Z₁ Z₂ Z₃ Z₄ Z₅ Z₆ Z₇ Z₈ Z₉ Z₁₀ Z₁₁ Z₁₂

Serial ID includes the information as below:

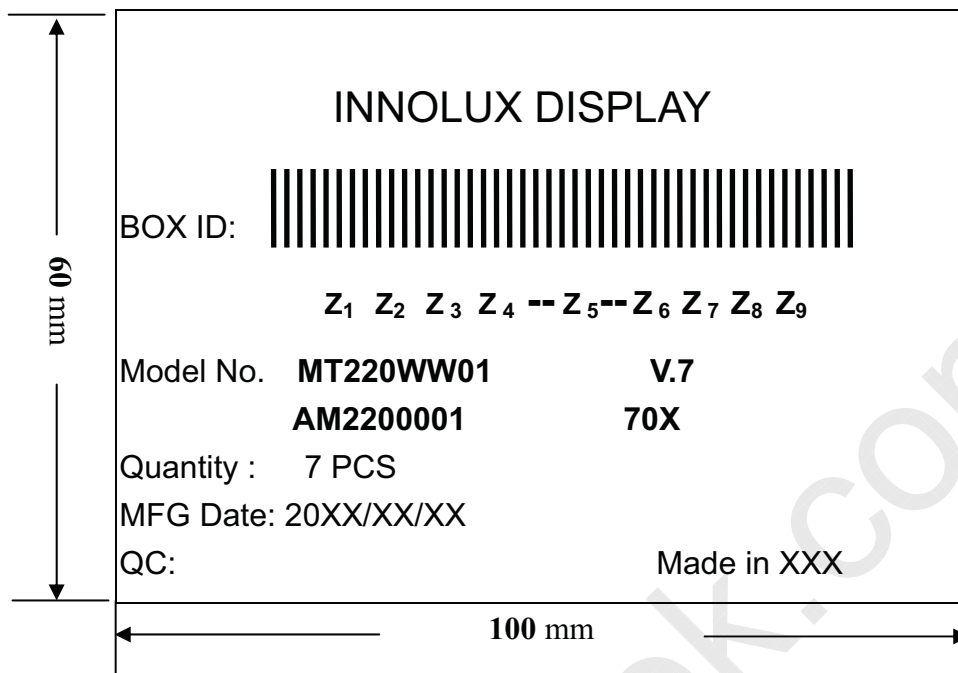
1. Manufactured Date: Year: 0~9, for 2000~2009
2. Month: 1~9 & A~C for Jan.~Dec.
3. Date: 1~9 & A~Z (exclude I, O, Q, U) for 1th~31th
4. Code of grade: 1, 2, 3, 5, E
5. Serial No.: Module manufacture sequence number.

(d) Serial ID II (INL internal use)

SPEC NO. MT220WW01 V.7

PAGE : 22/24

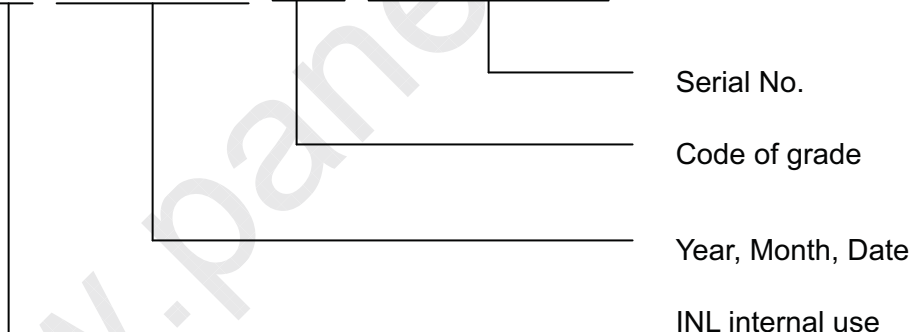
2. Carton Label



(a) Model Number: MT220WW01

(b) Version: V.7

(c) Packing quantity: 7 pcs

(d) Serial ID: Z₁ Z₂ Z₃ Z₄ Z₅ Z₆ Z₇ Z₈ Z₉

Serial ID includes the information as below :

(a) Manufactured Date: Year: 0~9, for 2000~2009

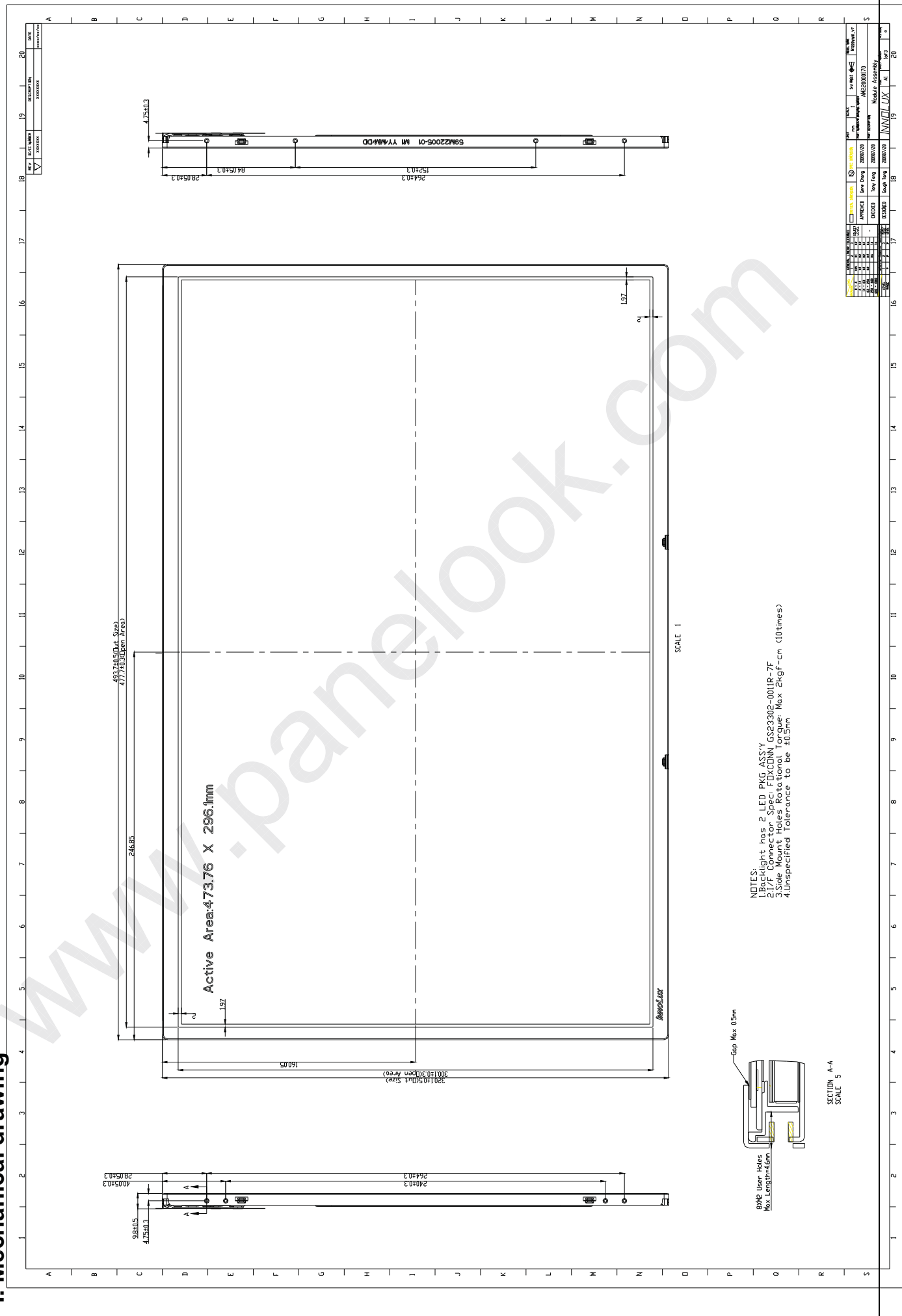
Month: 1~9 & A~C for Jan.~Dec.

Date: 1~9 & A~Z (exclude I, O, Q, U) for 1th~31th

(b) Code of grade: 1, 2, 3, 5, E

(c) Serial No.: Module packing sequence number.

I. Mechanical drawing



[illegible]